

NON-PUBLIC?: N  
ACCESSION #: 9302220468  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Salem Generating Station - Unit 1 PAGE: 1 OF 4

DOCKET NUMBER: 05000272

TITLE: Manual Reactor Trip due to Trouble with the Turbine  
Bypass System  
EVENT DATE: 01/16/93 LER #: 93-002-00 REPORT DATE: 02/21/93

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 016

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: M. J. Pollack - LER Coordinator TELEPHONE: (609) 339-2022

COMPONENT FAILURE DESCRIPTION:  
CAUSE: B SYSTEM: SD COMPONENT: PCO MANUFACTURER: W120  
REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

#### ABSTRACT:

On 1/16/93, during shutdown to Mode 3 (Hot Standby) for maintenance, a manual reactor trip was initiated when 12 Steam Generator Feedwater Pump (SGFP) tripped (11 SGFP was cleared and tagged) due to a turbine trip/feedwater isolation signal (from a 13 Steam Generator (S/G) High-High Level signal). Prior to the turbine trip, Turbine Bypass System control was being transferred from "T sub ave" to "Steam Pressure". During this evolution, Turbine Bypass Valves went full open causing a S/G "swell". 13 S/G swelled to the high-high level alarm setpoint resulting in the turbine trip/feedwater isolation signal, an Engineered Safety Feature (ESF). Per design, the 20 valves which provide steam from the S/Gs to the Turbine-Generator isolated and the operating SGFP tripped. Following this, the Turbine Bypass System valves were closed and a manual Reactor trip was initiated. Plant response was as expected following the reactor trip including the degree of Reactor Coolant System cooldown (as has occurred after prior plant trips). Per

procedure, a Main Steamline Isolation (an ESF) was initiated stopping the cooldown. The plant was stabilized in Mode 3. The root cause of this event is equipment failure. The Turbine Bypass Pressure Controller and the associated servo potentiometer module of the Turbine Bypass Control System failed causing the controlling station setpoint to go from approximately 1040 psi to 196 psi in approximately 5 seconds. This caused the Turbine Bypass Valves to fully open. The faulty Turbine Bypass System components were replaced. The Unit was returned to service 1/24.

END OF ABSTRACT

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#### PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as {xx}

#### IDENTIFICATION OF OCCURRENCE:

Manual Reactor Trip due to trouble with the Turbine Bypass System

Event Date: 1/16/93

Report Date: 2/11/93

This report was initiated by Incident Report No. 93-047.

#### CONDITIONS PRIOR TO OCCURRENCE:

Mode 1 Reactor Power 16% - Unit Load 130 MWe

#### DESCRIPTION OF OCCURRENCE:

On January 16, 1993, at 0952 hours, during shutdown to Mode 3 (Hot Standby) for planned maintenance, a manual reactor trip was initiated when 12 Steam Generator Feedwater Pump (SGFP) tripped due to a turbine trip/feedwater isolation signal. This signal initiated from a 13 Steam Generator (S/G) High-High Level signal. At the time of the event, 11 SGFP was cleared and tagged in support of maintenance.

Prior to the tu

bine trip, Operations personnel were transferring Turbine Bypass System control from "T ave" to "Steam Pressure" per Integrated Operating Procedure, IOP-5, Minimum Load to Hot Standby", and Operations Procedure OP-III-2.3.4, "Steam Dump System Normal Operation". During this evolution, Turbine Bypass Valves 11-13TB10 and 11-13TB20 unexpectedly went full open causing a S/G swell". 13 S/G swelled to the high-high level alarm setpoint resulting in the turbine trip/feedwater isolation signal.

Turbine trip/feedwater isolation is an Engineered Safety Feature (ESF). Per design, the twenty (20) valves which provide steam from the S/Gs to the Turbine-Generator isolated and the operating SGFP tripped. Following this, the Turbine Bypass System valves were closed (from the Control Room by turning the Turbine Bypass Controls to "OFF") and a manual Reactor trip was initiated per Alarm Response Procedure, S1.OP-AR.ZZ-0006(Q).

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#### DESCRIPTION OF OCCURRENCE: (cont'd)

Plant response was as expected following the reactor trip including the degree of Reactor Coolant System {AB} cooldown (as has occurred after prior plant trips). In accordance with Emergency operating Procedure EOP-TRIP-2, a Main Steamline Isolation (an ESF) was initiated stopping the cooldown. The plant was stabilized in Mode 3.

#### APPARENT CAUSE OF OCCURRENCE:

The root cause of this event is equipment failure. The Turbine Bypass Pressure Controller (PC-507) and the associated servo potentiometer module of the Turbine Bypass Control System failed causing the controlling station setpoint to go from approximately 1040 psi to 196 psi in approximately five (5) seconds. This caused the Turbine Bypass Valves to fully open. Troubleshooting duplicated the sequence of events.

A review of Turbine Bypass System work orders did not identify signal component problems similar to those experienced in this event.

#### ANALYSIS OF OCCURRENCE:

In conjunction with the Rod Control System, the Turbine Bypass System provides T sub ave control below 15% reactor power. The

system provides for a variable artificial steam load. The system is not required for either safe plant operation or safe shutdown. It is designed to pass 40% of rated steam flow.

The manual reactor trip was anticipatory and is a standard practice to limit undue demand on the automatic protection system. Had the operators not manually tripped the reactor, the plant would have tripped on S/G Low-Low level. All systems functioned as designed and the Reactor was placed in a stable condition.

The Reactor Protection System (RPS) {JC} functioned as designed and the heat sink was maintained during this event. Since the RPS is designed for the thermal and hydraulic effects of four-hundred (400) full power reactor trips, this low power reactor trip resulted in a thermal transient well within the design limits of the system. This event therefore involved no undue risk to the health or safety of the public. However, due to the Turbine Trip/Feedwater Isolation actuation, RPS system actuation, and the initiation of Main Steamline Isolation, the circumstances surrounding these events are reportable in accordance with Code of Federal Regulations 10CFR 50.73(a)(2)(iv).

The reduction in T sub ave requiring main steamline isolation, has been experienced during other reactor trips (e.g., Unit 2 LER 311/92-009-00). Engineering has investigated T sub avg reduction (during trips) and design modifications are being assessed.

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#### CORRECTIVE ACTION:

The faulty Turbine Bypass System components were replaced, calibrated and tested satisfactorily. The Unit was returned to service January 24, 1993, after completion of the planned maintenance activities.

#### EQUIPMENT FAILURES:

Component: Turbine Bypass Pressure Controller  
Manufacturer: Westinghouse  
Model: 124 (Serial #HO-114)

General Manager -  
Salem Operations

BWL:pc

SORC Mtg. 93-014

ATTACHMENT 1 TO 9302220468 PAGE 1 OF 1

PSEG

Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge,  
New Jersey 08038

Salem Generating Station

February 11, 1993

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

Dear Sir:

SALEM GENERATING STATION  
LICENSE NO. DPR-70  
DOCKET NO. 50-272  
UNIT NO. 1

LICENSEE EVENT REPORT 93-002-00

This Licensee Event Report is being submitted pursuant to the requirements of the Code of Federal Regulations 10CFR 50.73(a)(2)(iv). This report is required to be issued within thirty (30) days of event discovery.

Sincerely yours,

C. A Vondra  
General Manager -  
Salem Operations

MJP:pc

Distribution

The Energy People

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